

ADDENDUM TO BLACKFOOT RIVER TMDL: WATERBODY ASSESSMENT AND TOTAL MAXIMUM DAILY LOAD

Margin of Safety and Seasonal Variation Associated with Sediment Targets

In general, targets for sediment do not lend themselves to seasonal variation. Sediment input into a stream is natural and streams can process sediment up to their assimilative capacity. Once above the loading capacity of a stream, sediment can affect aquatic communities when, for example, high levels of water column sediment can abrade fish gills or discourage feeding by salmonids. As sediment settles, filling interstitial spaces in the streambed, changes can occur in the aquatic macroinvertebrate community and habitat is degraded for salmonid spawning.

Most sediment input tends to be seasonal in association with high flows as one might see during spring runoff or episodic storm events. However, all potential detrimental effects on the aquatic community are not seasonal. In other words, the concern is not when input occurs but when that input impairs beneficial uses. For example, a summer thunderstorm in an upper watershed, which results in an influx of sediment, would affect those fish unable to find refuge outside the main stream channel. As the slug of sediment works its way downstream to a larger river, especially one which did not experience the episodic event, sediment may settle out on the streambed surface thus having the potential to impair cold water aquatic life and salmonid spawning at a later date. Thus, if at any time during the year sediment input has potential to impair beneficial uses at a later time - days, weeks, or possibly years - then it is understandable why sediment does not lend itself to seasonal variation.

One situation where it makes sense to account for seasonal variation is with water column sediment. We would naturally expect higher concentrations of sediment during spring runoff. Thus, targets for suspended sediment might include a higher concentration during the high flow period as compared to the low flow period.

Turbidity targets

Recommended turbidity targets for Dry Valley Creek include a margin of safety. The suspended sediment equivalents to the target turbidities are within or below the range of 25 to 80 mg/l of suspended solids required to maintain good to moderate fisheries (EIFAC 1964).

We did account for seasonal variation for turbidity targets at the upper site in Dry Valley Creek with a higher concentration recommended for high flows in the spring and a lower concentration for low flows at all other times. These recommendations are averages over a two-week or 28-day period to account for extreme fluctuations. Recommended targets in lower Dry Valley Creek are essentially no net increase values and therefore no seasonal variation was applied.

Streambank stability

The margin of safety (MOS) for the 80% streambank stability target is implicit as described by Tom Herron in the Little Lost River Subbasin TMDL (DEQ 2000), for which the sediment section was approved by EPA in 2000.

“The MOS is the conservative assumptions used to develop existing sediment loads. Conservative assumptions made as part of the sediment loading analysis include . . . (d)esired bank erosion rates are representative of background conditions of 80% streambank stability . . .”

No seasonal variation is recommended for streambank stability as a surrogate to sediment input. The concept itself is of managing for stable streambanks within the understanding of stream dynamics. A seasonal variation factor thus would not work. For example, a target of 80% streambank stability could not be recommended for part of the year (e.g., spring runoff period) while 50% streambank stability is recommended for the rest of the year.

Depth fines

The recommended depth fines target for the Blackfoot River subbasin includes a 2% margin of safety. Based on work by Burton et al. (1990) in southern Idaho streams, a 27% target for depth fines would be appropriate for the Blackfoot River subbasin. Recommending a target of 25% thus allowed for a margin of safety.

There is an inherent seasonal variation associated with depth fines. Much of the work on establishing thresholds for fine sediment in subsurface of streambeds is coordinated with that time when salmonids spawn - generally from after spring runoff to fall, depending on species. Monitoring for depth fines is normally done during the summer field season, a time of lower flows in the Blackfoot River subbasin, which adequately characterizes conditions likely to be experienced by spawning salmonids, incubating eggs, and emerging fry. Summer sampling also includes the period of greatest insect production in this area. Thus, the time period for typical sampling for depth fines corresponds to the season that sediment is most likely to affect beneficial uses of salmonid spawning and cold water aquatic life.

Literature Cited

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